Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH END SEMESTER EXAMINATIONS, APRIL 2019

SUBJECT: ENERGY ENGINEERING [MME 3282]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **all** the questions.
- Missing data may be suitably assumed.

1A. Explain the features of high and super critical pressure boilers. **3**

1B. What are the advantages of pulverization of coal? With sketch briefly explain the working of Cyclone burner. **3**

1C. Draw the layout of a modern steam power plant and explain the four circuits involved in this. **4**

2A. With neat sketch explain the working of diesel engine power plant. **3**

2B. 200 MW of electrical power is required for a city. If this is to be supplied by a nuclear reactor of efficiency 20 %, using U^{235} as the nuclear fuel, calculate the amount of fuel required for one day operation. Assume that energy released per fusion of U^{235} nuclide = 200MeV. **3**

2C. With neat sketch explain the working of Boiling Water Reactor (BWR). Mention the advantages and disadvantages of BWR compared to the Pressurized Water Reactor (PWR). **4**

3A. Calculate the maximum day length at Udupi (13.3409° N, 74.7421° E) on May 15. **3**

3B. With the neat sketch explain the working of solar flat plate collector. **3**

3C. Write short notes on the following

(a) Spring tide and neap tide

(b) Pyranometer **4**

4A. It is desired to set up a power plant to covert the ocean tidal energy into electricity. The plant should consist of single basin and generates power only during high tides. Derive the expression for power output for the proposed power plant in terms of range of the tide **3**

4B. Differentiate the horizontal axis and vertical axis wind turbine power generation method. **3**

4C. Ocean waves on an Indian coast had an amplitude of 1.2 m with a period of 6 seconds measured at the surface of the water 110 m deep. Taking water density as 1025 kg/m^3, calculate the following- (a) Wave velocity (b) Energy density (c) Power density of the wave. **4**

5A. With neat sketch explain the Fixed dome type biogas plant. **3**

5B. With neat sketch explain the geothermal energy conversion in liquid dominated reservoir. **3**

5C. At particular site the mean monthly average discharge is as follows:

Month	**Mean discharge per month (millions of cu m)**		**Month**	**Mean discharge per month (millions of cu m)**
April	100		October	800
May	250		November	750
June	750		December	750
July	1250		January	500
August	1500		February	400
September	1200		March	300

(a) Draw Hydrograph and find the average discharge available for the whole period.

(b) Draw Flow duration Curve.

4